CLAIMS

1. A method of inhibiting growth in a lung cancer cell comprising contacting the cell with a therapeutically effective amount of deguelin or a derivative thereof in combination with a second agent.

2. The method of claim 1, wherein inhibiting comprises inducing apoptosis in the lung cancer cell.

3. The method of claim 1, wherein the second agent is a PI3K, MAPK or JNK inhibitor.

4. The method of claim 1, wherein the second agent is a chemotherapeutic agent.

5. The method of claim 4, wherein the chemotherapeutic agent is taxol or doxorubicin.

6. The method of claim 1, wherein the second agent is a radiotherapeutic agent.

7. The method of claim 1, wherein the deguelin derivative is 6a,2a-dehydrorotenone.

8. The method of claim 1, wherein the deguelin derivative is methoxyrot-2'-enoic acid.

9. The method of claim 1, wherein the deguelin derivative is tephrosin.

10. The method of claim 1, wherein the deguelin derivative is 7S-hydroxydeguelin.

11. The method of claim 1, wherein the deguelin derivative is rotenone.

12. The method of claim 1, wherein the deguelin derivative is 7a,13a-dehydrodeguelin.

13. The method of claim 1, wherein the deguelin derivative is 12-hydroxyrotenone.

14. The method of claim 1, wherein the deguelin derivative is 12,12a-dehydrorotenone.

15. The method of claim 1, wherein the deguelin derivative is isorotenone.

16. The method of claim 1, wherein the deguelin derivative is 4-chlororot-2'-enoic acid.

17. The method of claim 1, wherein the deguelin derivative is 1,2-dihydrodeguelin.

18. The method of claim 1, wherein the deguelin derivative is 2-phenylselenyl-1,2-dihydrodeguelin.

19. The method of claim 1, wherein the deguelin derivative is bromorot-2'-enoic acid.

20. The method of claim 1, wherein the cancer cell is a cell culture.

21. The method of claim 1, wherein the cancer cell is a tissue culture.

22. The method of claim 1, wherein the cancer cell is in a mammal.

23. The method of claim 22, wherein the mammal is a human.

24. The method of claim 1, wherein the cancer cell is a premalignant cancer cell.

25. The method of claim 1, wherein the cancer cell is a malignant cancer cell.

26. The method of claim 1, wherein the cancer cell is a metastatic cancer cell.

27. The method of claim 1, wherein the cancer cell is a non-small cell lung cancer cell, a small cell lung cancer cell, or a rare lung cancer cell.

28. The method of claim 27, wherein the non-small cell lung cancer is a squamous cell carcinoma, an adenocarcinoma or a large cell carcinoma.

29. The method of claim 27, wherein the small cell lung cancer is a lymphocytic small cell lung cancer, a intermediate small cell lung cancer or a combined small cell lung cancer.

30. The method of claim 29, wherein combined small cell lung cancer further comprises small cell lung cancer and squamous cell carcinoma.

31. The method of claim 29, wherein combined small cell lung cancer further comprises small cell lung cancer and adenocarcinoma.

32. The method of claim 27, wherein a rare lung cancer cell is a adenoid cystic carcinoma, a mesothelioma, a hamartoma, a lymphoma or a sarcoma.

33. The method of claim 27, wherein the lung cancer cell is a carcinoid tumor cell.

34. A method for treating or preventing lung cancer in a subject comprising providing to the subject a therapeutically effective amount of deguelin or derivative thereof in combination with a second agent.

35. The method of claim 34, further comprising inducing apoptosis in the cancer cell.

36. The method of claim 34, wherein the second agent is a PI3K, MAPK or JNK inhibitor.

37. The method of claim 34, wherein the second agent is a chemotherapeutic agent.

38. The method of claim 37, wherein the chemotherapeutic agent is taxol or doxorubicin.

39. The method of claim 34, wherein the second agent is a radiotherapeutic agent.

40. The method of claim 34, wherein the deguelin derivative is 6a,2a-dehydrorotenone.

41. The method of claim 34, wherein the deguelin derivative is methoxyrot-2'-enoic acid.

42. The method of claim 34, wherein the deguelin derivative is tephrosin.

43. The method of claim 34, wherein the deguelin derivative is 7S-hydroxydeguelin.

44. The method of claim 34, wherein the deguelin derivative is rotenone.

45. The method of claim 34, wherein the deguelin derivative is 7a,13a-dehydrodeguelin.

46. The method of claim 34, wherein the deguelin derivative is 12-hydroxyrotenone.

47. The method of claim 34, wherein the deguelin derivative is 12,12a-dehydrorotenone.

48. The method of claim 34, wherein the deguelin derivative is isorotenone.

49. The method of claim 34, wherein the deguelin derivative is 4-chlororot-2'-enoic acid.

50. The method of claim 34, wherein the deguelin derivative is 1,2-dihydrodeguelin.

51. The method of claim 34, wherein the deguelin derivative is 2-phenylselenyl-1,2-dihydrodeguelin.

52. The method of claim 34, wherein the deguelin derivative is bromorot-2'-enoic acid.

53. The method of claim 34, wherein the cancer is a premalignant cancer.

54. The method of claim 34, wherein the cancer is a malignant cancer.

55. The method of claim 34, wherein the cancer is a metastatic cancer.

56. The method of claim 34, wherein the cancer is a non-small cell lung cancer, a small cell lung cancer, or a rare lung cancer cell.

57. The method of claim 56, wherein the non-small cell lung cancer is a squamous cell carcinoma, an adenocarcinoma or a large cell carcinoma.

58. The method of claim 56, wherein the small cell lung cancer is a lymphocytic small cell lung cancer, a intermediate small cell lung cancer or a combined small cell lung cancer.

59. The method of claim 58, wherein combined small cell lung cancer further comprises small cell lung cancer and squamous cell carcinoma.

60. The method of claim 58, wherein combined small cell lung cancer further comprises small cell lung cancer and adenocarcinoma.

61. The method of claim 56, wherein the rare lung cancer is a adenoid cystic carcinoma, a mesothelioma, a hamartoma, a lymphoma or a sarcoma.

62. The method of claim 56, wherein the lung cancer is a carcinoid tumor.

63. The method of claim 34, wherein deguelin is provided to the subject before the second agent.

64. The method of claim 34, wherein deguelin is provided to the subject after the second agent.

65. The method of claim 34, wherein deguelin is provided to the subject at the same time as the second agent.

66. The method of claim 34, wherein deguelin is provided once.

67. The method of claim 34, wherein deguelin is provided more than once.

68. The method of claim 34, wherein the second agent is provided once.

69. Then method of claim 34, wherein the second agent is provided more than once.

70. The method of claim 34, wherein deguelin in combination with a second agent is provided once.

71. The method of claim 34, wherein deguelin in combination with a second agent is provided more than once.

72. The method of claim 34, wherein deguelin and the second agent are provided to a subject intratumoraly, intravenously, intraperitoneally, intramuscularly, orally, or by inhalation.

73. The method of claim 34, further comprising photodynamic therapy, or surgery.

74. A method for assaying for the inhibition of lung cancer cell growth comprising: a) providing a lung cancer cell sample; b) contacting the cell with an effective amount of deguelin or derivative thereof and a second agent; c) analyzing the cell for growth inhibition; and, d) comparing the inhibition of the cell growth in step (c) with the inhibition of a lung cancer cell in the absence of deguelin or derivative thereof and a second agent, wherein the difference in growth inhibition represents the growth inhibitory effect of deguelin or derivative thereof and a second agent.

75. The method of claim 74, wherein growth inhibition is analyzed by MTT assay.

76. The method of claim 74, further comprising analyzing the sample for induction of apoptosis.

77. The method of claim 76, wherein induction of apoptosis is analyzed by FACS.

78. The method of claim 74, further comprising analyzing the sample for inhibition of Akt activity.

79. The method of claim 78, wherein inhibition of Akt activity is analyzed by PI3K assay.

80. The method of claim 74, wherein the second agent is a PI3K, MAPK or JNK inhibitor.

81. The method of claim 74, wherein the second agent is a chemotherapeutic agent.

82. The method of claim 81, wherein the chemotherapeutic agent is taxol or doxorubicin.

83. The method of claim 74, wherein the second agent is a radiotherapeutic agent.

84. The method of claim 74, wherein the deguelin derivative is 6a,2a-dehydrorotenone.

85. The method of claim 74, wherein the deguelin derivative is methoxyrot-2'-enoic acid.

86. The method of claim 74, wherein the deguelin derivative is tephrosin.

87. The method of claim 74, wherein the deguelin derivative is 7S-hydroxydeguelin.

88. The method of claim 74, wherein the deguelin derivative is rotenone.

89. The method of claim 74, wherein the deguelin derivative is 7a,13a-dehydrodeguelin.

90. The method of claim 74, wherein the deguelin derivative is 12-hydroxyrotenone.

91. The method of claim 74, wherein the deguelin derivative is 12,12a-dehydrorotenone.

92. The method of claim 74, wherein the deguelin derivative is isorotenone.

93. The method of claim 74, wherein the deguelin derivative is 4-chlororot-2'-enoic acid.

94. The method of claim 74, wherein the deguelin derivative is 1,2-dihydrodeguelin.

95. The method of claim 74, wherein the deguelin derivative is 2-phenylselenyl-1,2-dihydrodeguelin.

96. The method of claim 74, wherein the deguelin derivative is bromorot-2'-enoic acid.

97. The method of claim 74, wherein the cancer sample is a non-small cell lung cancer, a small cell lung cancer, or a rare lung cancer.

98. The method of claim 97, wherein the non-small cell lung cancer is a squamous cell carcinoma, an adenocarcinoma or a large cell carcinoma.

99. The method of claim 97, wherein the small cell lung cancer is a lymphocytic small cell lung cancer, a intermediate small cell lung cancer or a combined small cell lung cancer.

100. The method of claim 99, wherein combined small cell lung cancer further comprises small cell lung cancer and squamous cell carcinoma.

101. The method of claim 99, wherein combined small cell lung cancer further comprises small cell lung cancer and adenocarcinoma.

102. The method of claim 97, wherein the rare lung cancer is a adenoid cystic carcinoma, a mesothelioma, a hamartoma, a lymphoma or a sarcoma.

103. The method of claim 97, wherein the lung cancer is a carcinoid tumor cell.

104. A pharmaceutical composition comprising deguelin or derivative thereof and a second agent.

105. The pharmaceutical composition of claim 104, wherein the second agent is a PI3K, MAPK or JNK inhibitor.

106. The pharmaceutical composition of claim 104, wherein the second agent is a chemotherapeutic agent.

107. The pharmaceutical composition of claim 106, wherein the chemotherapeutic agent is taxol or doxorubicin.

108. The pharmaceutical composition of claim 104, wherein the second agent is a radiotherapeutic agent.

109. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 6a,2a-dehydrorotenone.

110. The pharmaceutical composition of claim 104, wherein the deguelin derivative is methoxyrot-2'-enoic acid.

111. The pharmaceutical composition of claim 104, wherein the deguelin derivative is tephrosin.

112. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 7S-hydroxydeguelin.

113. The pharmaceutical composition of claim 104, wherein the deguelin derivative is rotenone.

114. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 7a,13a-dehydrodeguelin.

115. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 12-hydroxyrotenone.

116. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 12,12a-dehydrorotenone.

117. The pharmaceutical composition of claim 104, wherein the deguelin derivative is isorotenone.

118. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 4-chlororot-2'-enoic acid.

119. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 1,2-dihydrodeguelin.

120. The pharmaceutical composition of claim 104, wherein the deguelin derivative is 2-phenylselenyl-1,2-dihydrodeguelin.

121. The pharmaceutical composition of claim 104, wherein the deguelin derivative is bromorot-2'-enoic acid.